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FAILURE OF CORTICOBASAL® IMPLANTS: DISCUSSION ON POSSIBLE FAILURE REASONS

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Failure of Corticobasal® Implants: Discussion on Possible Failure Reasons

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Abstract

This case highlights the complications and eventual failure of a Corticobasal® implant-supported prosthesis due to a lack of post-operative follow-up and occlusal imbalance. A 67-year-old female underwent full-mouth rehabilitation with BECES® Corticobasal® implants and a metal-acrylic prosthesis. Despite successful surgical placement, the patient failed to attend scheduled follow-ups and developed a unilateral chewing pattern, leading to implant failure and dissatisfaction.

Keywords: Corticobasal® implants, implant failure, unilateral chewing pattern, patient compliance, prosthetic imbalance, propagating overload.

Introduction

Implant-supported prosthetic rehabilitation has evolved considerably with the advent of Corticobasal® implantology. This technology has shown to be particularly advantageous in patients with compromised amounts of alveolar bone, as they anchor in the cortical regions and allow immediate functional loading. The usage of even minimal cortical areas thereby eliminates the need for grafting and healing periods. Although the procedure itself is not invasive, the reset of the masticatory system is in many cases connected to a number of significant changes (i.e. correction of the vertical dimension, correction of adverse chewing patterns, removal of bone excess, removal of all teeth, etc.), which will lead to an answer of the masticatory system. This answer will then require timely adjustments of various parameters in the system. The long-term success of such treatments hinges hence not only on surgical and prosthetic precision, but also on professional post-operative maintenance carried out by specially trained treatment providers and by the patient's compliance¹.

Due to the thin and polished design of the implants, poor oral hygiene has a minimal effect on the treatment outcome as long as care is taken not to roughen the polished surface e.g. by using toothpaste. Since the treatment focusses on cortical anchorage and always more than enough implants per jaw are placed, non-adherence to dietary instructions will have no influence on the outcome. Missed follow-ups however can significantly compromise treatment outcomes because the situation of the contacts and the masticatory slopes will alter the function and the loading of each implant. The prosthetic design, occlusal balance, and the patient's neuromuscular adaptation play vital roles in ensuring long-term implant survival. Among the lesser-discussed but highly relevant factors in implant failure is the impact of unilateral chewing, which leads to uneven stress distribution and increased mechanical overload on specific implants as well as to underloading of others. Both underloading and overloading will lead to mobility of implants. If this development remains untreated (because appointments are missed), overload can propagate to areas of the jaws

which are initially not affected.

This case documents a failure scenario where the patient's non-compliance due to international travel obligations resulted in an otherwise preventable treatment breakdown^{2,3}.

Patient Information:

- Age: 67
- Sex: Female
- Relevant Medical History: Non-contributory

Clinical Findings:

- Presenting Symptoms: Partial edentulism in both arches; patient desired fixed teeth
- Physical Examination: Atrophic mandible; no signs of active infection

Timeline:

- Day 1: Clinical and radiographic evaluation
- Day 2: Surgical procedure and implant placement
- Day 4: Metal-acrylic prosthesis delivered
- Post-operative: Missed all scheduled follow-ups

Diagnostic Assessment:

- OPG imaging confirmed atrophic ridge and sufficient cortical anchorage zones
- Implants: BECES® Corticobasal® implants used in both arches
- Therapeutic Intervention:
- Mandibular Implants: Placed flap-less using a cortical engagement protocol
- Prosthesis: Metal-acrylic, full arch, screw-retained

Post-Operative Complications:

- Unilateral chewing pattern noted due to imbalance
- Mandibular implants eventually failed due to biomechanical overload
- No re-intervention possible as patient traveled and failed to return for follow-up

Follow-Up and Outcomes:

- Healing: Initial healing was satisfactory
- Follow-up: Missed despite multiple reminders
- Outcome: Implant failure in the mandible
- Patient Satisfaction: Poor due to functional and aesthetic dissatisfaction

Case Presentation

A 67-year-old female patient underwent full-mouth rehabilitation using Corticobasal® (BECES®) implants. Due to her upcoming travel to the United States, the prosthetic phase was completed in an expedited manner, and a metal-acrylic prosthesis was delivered shortly after implant placement. Despite clear instructions and repeated reminders for regular follow-ups, the patient did not return post-operatively.



Fig. 1a

Fig. 1a / 1b: CBCT showing the bone level pre-operatively in maxilla and mandible

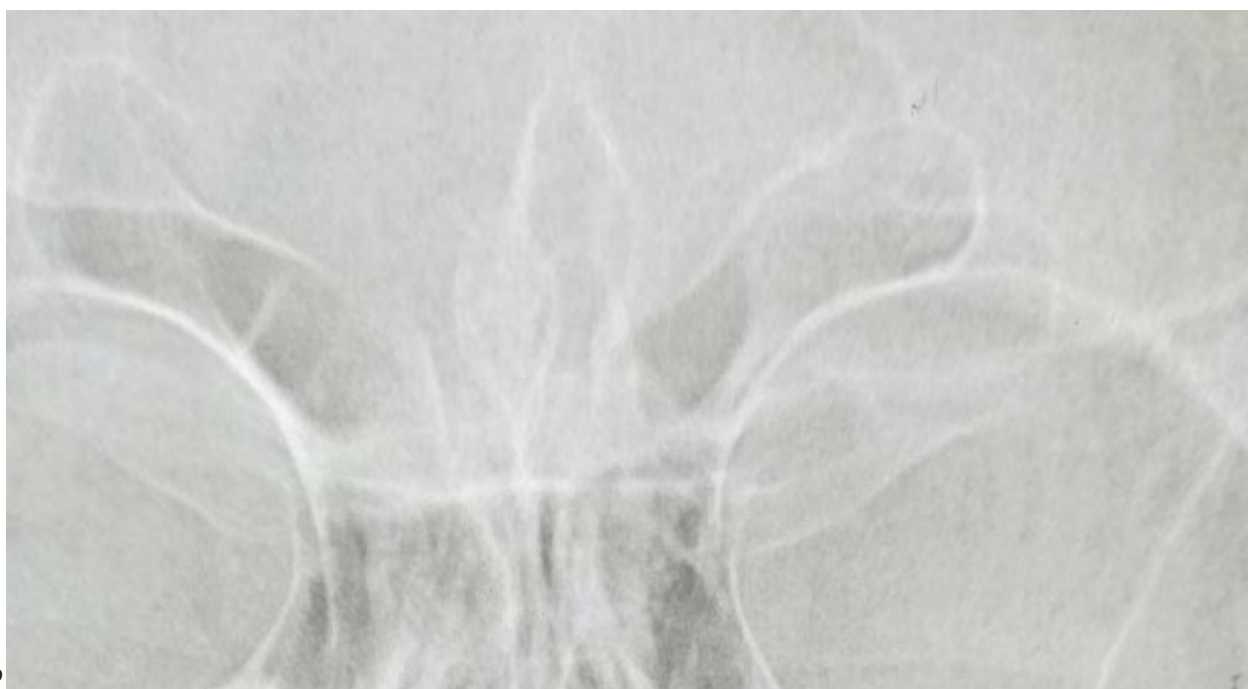


Fig. 1b



Fig. 2: OPG immediately after Corticobasal® implant placement

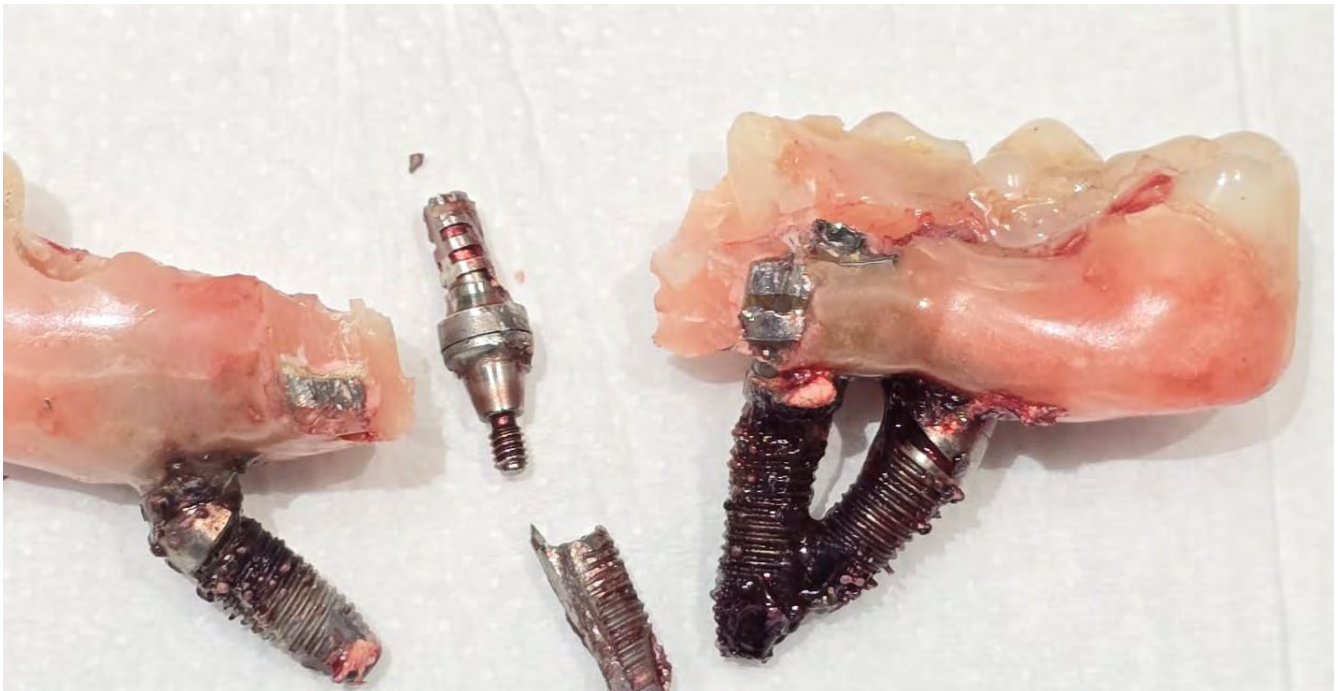


Fig. 3: Post-operative view demonstrating the metal acrylic prosthesis in situ



Fig. 4: Pre-operative intra oral view

Radiological Findings

Pre-operative CBCT (CS 9300) showed:

- Maxilla: Root stumps with chronic periapical abscess and condensing osteitis noted at #24 and #27. Maxillary sinus pathology including polypoidal mucosal thickening. Implant simulation at #24 (3.6 x 23.0 mm) and #27 (7.0 x 14.0 mm) suggested engagement with buccal cortex and nasal wall / floor.

- Mandible: Sparse and randomly oriented trabeculae in 36 - 37 region indicated D4 bone quality. Simulated implant sites showed dimensions of 4.6 x 17.0 mm (36) and 3.6 x 17.0 mm (37) with buccal cortical engagement.

Additional findings included multiple periapical lesions (e.g., #16, #26, #33) and generalized occlusal wear.

Outcome and Complications

The patient failed to attend any follow-up appointments after prosthesis placement. Over time, a unilateral chewing pattern developed, leading to an imbalance in occlusal loading. This progressively overloaded the implants, resulting in early implant failure in the mandibular arch and eventual compromise of the maxillary implants. As the occlusal scheme was never adjusted post-insertion, the biomechanical stress could not be alleviated. The patient later expressed dissatisfaction with the outcome.

According to the knowledge of the treatment provider, this case was never corrected or re-done.

Discussion

Corticobasal® implants have revolutionized prosthetic rehabilitation by enabling immediate loading and reducing surgical morbidity. These systems, such as the BECES® implants used in this case, derive primary stability from cortical bone, which remains structurally preserved even in aged or resorbed jaws. However, well-defined biomechanical principles must still be strictly followed to ensure long-term success¹.

In the present case, the major contributing factor to failure was the patient's lack of compliance. Despite multiple reminders, the patient did not return for occlusal adjustment and functional monitoring. Occlusal disharmony, especially due to unilateral chewing, is a well-documented cause of implant overloading and failure. A balanced distribution of masticatory forces is crucial for the longevity of full-arch prostheses, especially when using single-piece Corticobasal® implants that rely on immediate function, equal force distribution between all implants, and adequate and stable chewing patterns^{1,2}.

Unilateral chewing not only stresses specific implants disproportionately but also leads to prosthesis wear, screw loosening, and bone micro fractures and mechanically overloaded and underloaded zones. Given that the patient left for the US within a short time period and for good, there was no opportunity for timely occlusal adjustments, hygiene checks, or early intervention.

Patient education is another critical factor. It must be emphasized that even with such an advanced implant technology, the biological and mechanical principles of osseofixation (as the guiding principle for the functioning of Corticobasal® implants) must be respected. An adequate treatment plan including a stable and controlled load distribution is necessary. While Corticobasal® implants bypass the need for bone augmentation and enable swift restoration, they demand strict follow-up protocols for good long-term outcomes.

This case serves as an important reminder that implant therapy is a collaborative process and that the patient is involved. The clinician's responsibility extends beyond the surgery to ensuring patients understand the significance of maintenance. Meanwhile, patients must commit to post-treatment care, especially when logistical factors like international travel are involved.

There is limited literature documenting Corticobasal® implant failures due to unilateral or anterior chewing patterns. This is highlighting the need for broader awareness and further study. Restorations with Corticobasal® implants do not

require unloaded healing times and they deliver very fast results. Maybe these features lead to a situation where some (few) patients believe that there are no obligations from their side besides paying the invoice.

Corticobasal® implants allow for immediate functional loading and bypass conventional bone augmentation techniques. However, they demand precise occlusal planning and long-term follow-up to ensure success. In this case, the patient's expedited treatment and subsequent non-compliance led to functional overload and periimplant complications. The use of metal-acrylic prosthesis, while cost-effective, may not have withstood the imbalance in occlusal forces.

The case emphasizes the need for:

- Patient education on compliance
- Regular follow-up, especially post full-arch rehabilitation
- Proper occlusal adjustments in the healing phase, including regular monitoring and adjustment of the vertical dimension

Considerations Regarding the Origin of the Problem(s)

Since there are no later post-operative x-rays available for the case shown here (except Fig. 3), we have to speculate about the origin of the problems that occurred. There are good reasons to assume that the road to failure was determined by wrong positioning of some of the implants in the lower jaw.

Fig. 3 shows that the endosseous parts of implants are very close to each other in area 46, and 43, so that the missing distance between implant could have been the origin of local osteolytic activity in the bone. This type of osteolysis occurs independently from overloading or underloading. At the same time, the implants 33 and 43 did not show the medial inclination as demanded in IF® Method No. 2a. The inclination of IFM 2a implants is necessary in order to facilitate vertical load transfer along the thread-free endosseous implant surface. In addition, the medial inclination of these implants ensures that the distal set of implants (46, 47) and the anterior set of implants (43, 44) show diverging directions, which will prevent mobilities and overloading. Not all these aspects had been adequately

considered by the treatment provider. This may have happened because the patient did not leave enough time for correction in the first place.

The treatment of the lower jaw did not follow the rules for the creation of a BIPS® as defined by the International Implant Foundation IF® in nine "Consensus documents" and in many "IF® Clinical Guidelines".

In the case described here, the patient had requested compensation through a national court. The court ruled that first of all the patient's failure to come in for follow-ups and allow timely adjustments of all kinds (as they are necessary due to the nature of the intervention / treatment) has significantly increased the chances for failure. Although mobile implants had created long-term pain, the court decided that if the patient had complied with her (the patient's) obligation, pain and discomfort would have been minimal and in a range which has to be accepted for this kind of treatment.

Literature^{4,5} and various clinical reports demonstrate that if a patient misses the first three-month follow-up as well as the second follow-up twelve months later, the incidence of complication and failure raises dramatically to 30% (of the uncontrolled cases) and that clinical failures occur typically after 2.5 (uncontrolled) years post-operatively.

The same long-term study⁶ (which observed a total of 1680 full jaw reconstructions during up to twelve years) showed that no complete failures of full jaw reconstructions were seen after the Corticobasal® implants were four and more years in the oral cavity. Hence, Kaplan Maier calculations that predict the survival into the future cannot be applied to this implant technology.

Conclusion

Corticobasal® implants offer predictable outcomes when installed and maintained with strict protocol adherence. Patient cooperation is crucial. Non-compliance in this case nullified the otherwise successful surgical and prosthetic phases, leading to implant failure and dissatisfaction.

Informed Consent

The patient was informed about the treatment procedure and potential complications. Due to anonymity and lack of post-operative contact, retrospective consent for publication was not obtained. Therefore, all clinical pictures that would help the identification of the patient were removed from the report.

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6 Ihde S. (speaker) , Sipic O., Ihde A. A Prospective Long-Term Study on the Strategic Implant® - This Study Changed the Dental World and the „Gold Standard“ in Oral Implantology. Outline of the lecture:

1. Results of Treatments with the Technology of the Strategic Implant®
2. Description of Results of Comparable Study from the Field of Osseointegration
3. Comparison of the Results of the Two Studies
4. Implication for the Future Direction in Oral Implantology and in Dentistry
5. Guidelines for Evaluation of Alternative Treatment Technologies (in General)

Lecture given at the III Congreso Iberoamericano de Implantología Estratégica Corticobasal®, Cartagena / Colombia, 21.03.2025. The lecture was also given at the 1st North African Conference on the Technology of Corticobasal® Implants, Hammamet / Tunisia, in April 2025.